LILIN

4/8/16CH DIGITAL VIDEO RECORDER

DVR304/308/316

INSTRUCTION MANUAL

Summary

DVR series are designed to meet the demands for full 4/8/16-channel real-time recording systems. Frame rate, video quality, and resolution can be adjusted for each channel to meet recording requirement. VGA engines are built-in 3D intellectual motion adoptive refinement with vivid image enhancement algorithm to provide best video quality.

DVR series provide various backup features include USB DVD/RW, USB flash disk, HTTP download, and Backup Manager FTP for multiple DVRs' files download. Mobile phone device remote monitoring is also supported. Browser based remote live monitoring and video playback features are provided.

The DVR can provide D1 real-time for 4-channel and CIF real-time for 8-/16-channel recording and playback. Full features web-based user interface, multiple DVR system monitoring features, various backup features, and easy of cabling, the DVR is ideal solution for DVR applications.

Major Features

- Full D1 real-time for 4-ch and CIF real-time for 8-/16-channel H.264 recording and playback
- VGA outputs at 1920 * 1080i, built-in 3D intellectual motion adoptive refinement and vivid image enhancement engines
- Concurrent multiple-channel playback for 4/8/16-channel.
- Audio recording and playback
- Full features of remote controller controlling
- HTTP web-based interface including DVR configuration, PTZ control, playback, and live monitoring.
- 3G mobile phone solutions provided.
- Resolution, frame rate, and video quality configurable for each channel.
- LCD Power saving design.

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Caution

- **Do not drop or strike this equipment**
- **Do not install the equipment near any naked flames or heat sources**
- **Do not expose this unit to rain, moisture, smoke or dust environment**
- **Do not cover the opening of the cabinet with cloth and plastic or to install this unit in poor ventilated places. Allow 10cm between this unit and its surroundings**
- **Do not continue to operate the unit under abnormal conditions such as detection of smoke, strange smell or no display on screen while power is turned on**
- **Do not touch the power connection with wet hands**
- **Do not damage the power cord or leave it under pressure**
- **Do not operate this unit near magnet, speaker system, etc., to avoid unnecessary magnetic interference**
- **Connection cables should be grounded properly**

CAUTION

RISK OF EXPLOSION IF BATTERY IS REPLACED BY AN INCORRECT TYPE.

DISPOSE OF USED BATTERIES ACCORDING TO THE INSTRUCTIONS

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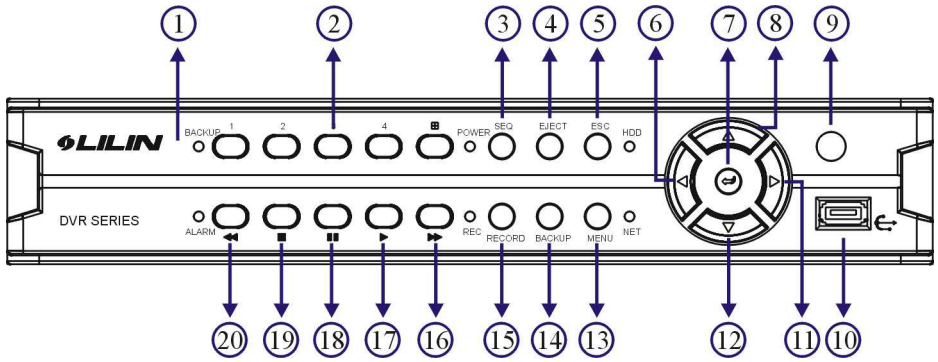
CHAPTER 1. SYSTEM OVERVIEWS

Chapter 1-1. Front Panel

[DVR304]



1. LED status panel
Please see system LED status panel.

2. Split-display/camera buttons
a. 4 split-display
b. Camera selection mode

3. SEQ button

4. EJECT button

5. ESC

6. Left button
a. Move cursor left at menu setup.
b. Pan left at PTZ control mode.
c. Decrease a value.

7. Enter button
a. Enter operation in menu setup.
b. Instant PTZ camera selection at live mode.
c. Camera active mode

8. Up button
a. Move cursor up in menu.
b. Tilt up at PTZ control mode.

9. Remote control IR receiver

10. USB 2.0 connector
a. USB flash disk
b. USB DVD/RW

11. Right button
a. Move cursor right in menu.
b. Pan right at PTZ control mode.
c. Increase a value.

12. Down button
a. Move cursor down at menu mode.
b. Tilt down at PTZ control mode.

13. Menu button

14. Backup button

15. REC button
Start recording operation or stop the recording task.

16. Fast forward button
a. Video fast forward
b. Next event page

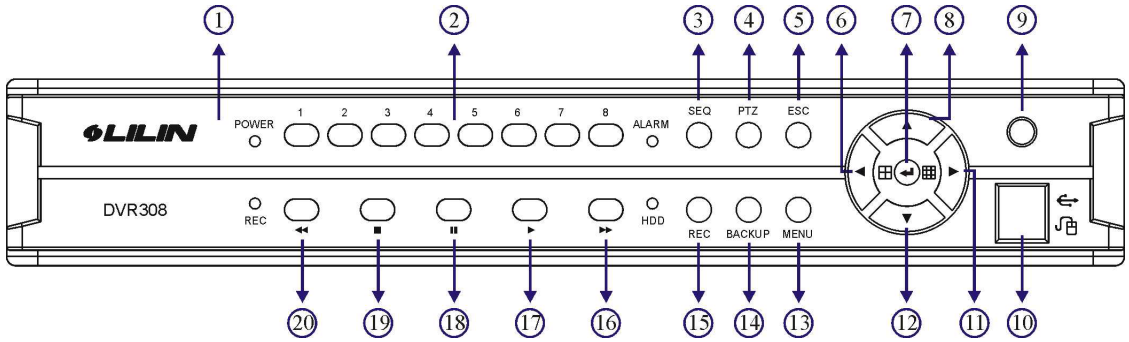
17. Play button
a. Invoke playback selection menu.
b. Replay after FF, FR, Pause, stepping when playing video.

18. Pause button

19. Stop video playback button
Live: freeze video, playback: pause video

20. Fast reverse button
a. Video fast reverse
b. Previous event page

[DVR308]



1. LED status panel
Please see system LED status panel.

2. Camera buttons
Camera selection mode

3. SEQ button

4. PTZ button
a. At PTZ control mode
b. At Split-display mode

5. ESC button

6. Left button / Split-display
a. Move cursor left at menu setup.
b. Pan left at PTZ control mode.
c. Decrease a value.
d. 4 split-display

7. Enter button
a. Enter operation in menu setup.
b. Instant PTZ camera selection at live mode.
c. Camera active mode

8. Up button
a. Move cursor up in menu.
b. Tilt up at PTZ control mode.

9. Remote control IR receiver

10. USB 2.0 connector
a. USB flash disk
b. USB DVD/RW
c. USB MOUSE

11. Right button / Split-display
a. Move cursor right in menu.
b. Pan right at PTZ control mode.
c. Increase a value.
d. 9 split-display

12. Down button
a. Move cursor down at menu mode.
b. Tilt down at PTZ control mode.

13. Menu button

14. Backup button

15. REC button
Start recording operation or stop the recording task.

16. Fast forward button
a. Video fast forward
b. Next event page

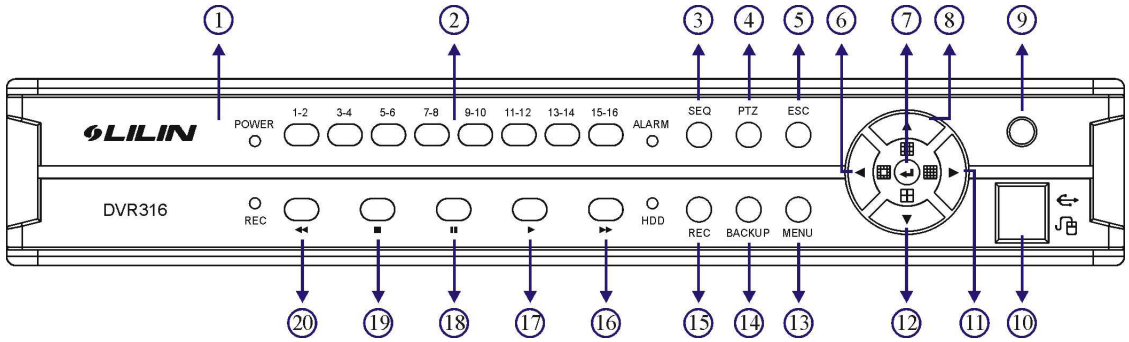
17. Play button
a. Invoke playback selection menu.
b. Replay after FF, FR, Pause, stepping when playing video.

18. Pause button
Live: freeze video, playback: pause video

19. Stop video playback button

20. Fast reverse button
a. Video fast reverse
b. Previous event page

[DVR316]



1. LED status panel
Please see system LED status panel.

2. Camera buttons
Camera selection mode

3. SEQ button

4. PTZ button
a. At PTZ control mode
b. At Split-display mode

5. ESC button

6. Left button / Split-display
a. Move cursor left at menu setup.
b. Pan left at PTZ control mode.
c. Decrease a value.
d. 13 split-display

7. Enter button
a. Enter operation in menu setup.
b. Instant PTZ camera selection at live mode.
c. Camera active mode

8. Up button / Split-display
a. Move cursor up in menu.
b. Tilt up at PTZ control mode.
c. 9 split-display

9. Remote control IR receiver

10. USB 2.0 & Mouse connector
a. USB flash disk
b. USB DVD/RW
c. USB MOUSE

11. Right button / Split-display
a. Move cursor right in menu.
b. Pan right at PTZ control mode.
c. Increase a value.
d. 16 split-display

12. Down button / Split-display
a. Move cursor down at menu mode.
b. Tilt down at PTZ control mode.
c. 4 split-display

13. Menu button

14. Backup button

15. REC button
Start recording operation or stop the recording task.

16. Fast forward button
a. Video fast forward
b. Next event page

17. Play button
a. Invoke playback selection menu.
b. Replay after FF, FR, Pause, stepping when playing video.

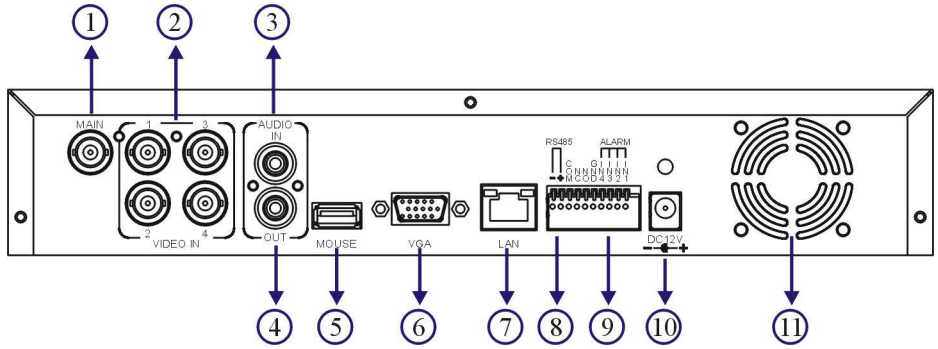
18. Pause button
Live: freeze video, playback: pause video

19. Stop video playback button

20. Fast reverse button
a. Video fast reverse
b. Previous event page

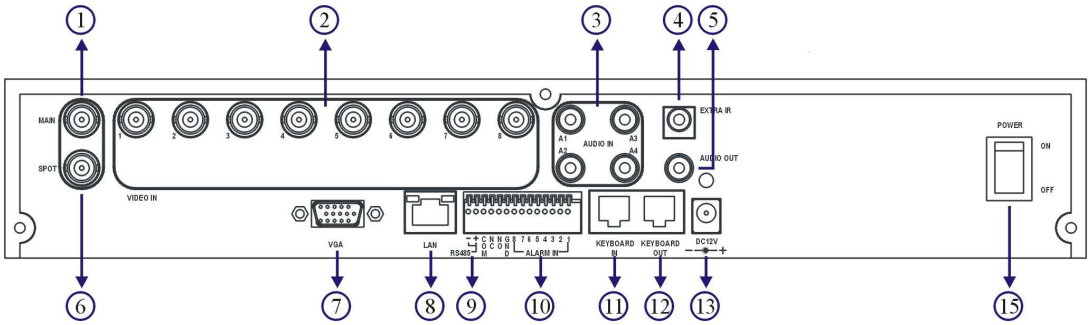
Chapter 1-2. Rear View

[DVR304]



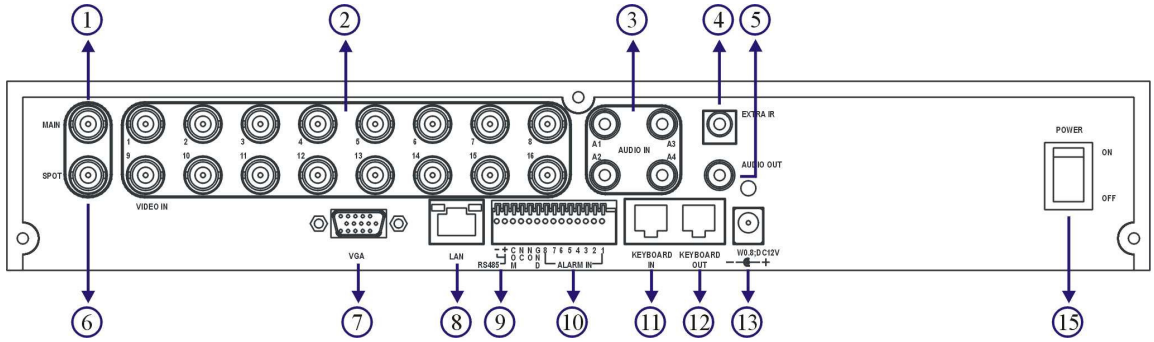
1. **Main monitor**
2. **Camera inputs**
   Analog camera BNC inputs
3. **Audio inputs**
   Four RCA audio connectors
4. **Audio output**
5. **USB connector**
   For mouse connection
6. **VGA output**
7. **Network RJ-45 connector**
8. **RS-485**
   For PTZ connection
9. **Alarm I/Os**
   Alarm input switches, 1 N/O alarm output, and 1 N/C alarm output
10. **DC 12V input**
11. **Fan**

[DVR308]



1. **Main monitor**
2. **Camera inputs**
   Analog camera BNC inputs
3. **Audio inputs**
   Four RCA audio connectors
4. **External IR receiver (RCA)**
5. **Audio output**
6. **Spot monitor**
   a. Spot monitor accessible by keyboard.
   b. Each spot output can be programmable for alarmed camera display and sequence display.
7. **VGA output**
8. **Network RJ-45 connector**
9. **RS-485**
   For PTZ connection
10. **Alarm I/Os**
    Alarm input switches, 1 N/O alarm output, and 1 N/C alarm output
11. **RJ-45 Keyboard-in**
    Connected from previous DVR's keyboard output in daisy chain.
12. **RJ-45 Keyboard-out**
    Connect to the next DVR's input.
    RJ-45 connector
13. **DC 12V input**
15. **Power switch**

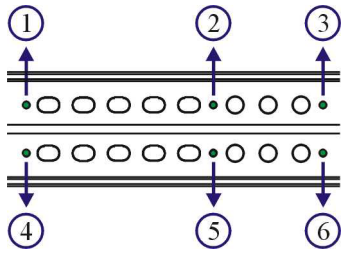
[DVR316]



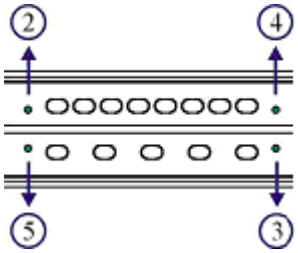
1. **Main monitor**
2. **Camera inputs**
   Analog camera BNC inputs
3. **Audio inputs**
   Four RCA audio connectors
4. **External IR receiver (RCA)**
5. **Audio output**
6. **Spot monitor**
   a. Spot monitor accessible by keyboard.
   b. Each spot output can be programmable for alarmed camera display and sequence display.
7. **VGA output**
8. **Network RJ-45 connector**
9. **RS-485**
   For PTZ connection
10. **Alarm I/Os**
    Alarm input switches, 1 N/O alarm output, and 1 N/C alarm output
11. **RJ-45 Keyboard-in**
    Connected from previous DVR's keyboard output in daisy chain.
12. **RJ-45 Keyboard-out**
    Connect to the next DVR's input.
    RJ-45 connector
13. **DC 12V input**
15. **Power switch**

Chapter 1-3. System LED Status Panel

System LEDs are meaningful while operating the DVR. The status of each LED is described as in the following table:



[DVR304]



[DVR308/316]

Item	LED	Description	Color
1	BACKUP	Backup LED indicator	Green (blinking)
2	POWER	DVR power on/off indicator	Yellow
3	HDD	Master HDD recording indicator	Green (blinking)
4	ALARM	External alarm switches indicators when motioned or alarmed	Red
5	REC	Recording indicator	Yellow
6	NET	Network indicator	Green

Chapter 1-4. Remote controller

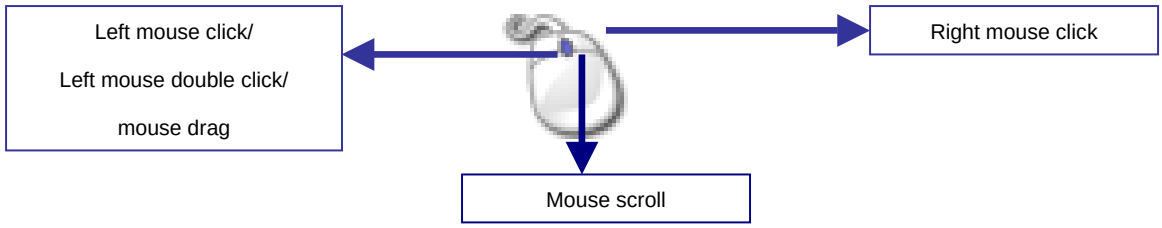
The button arrangement of the remote controller is designed for easy-to-use purposes. Buttons are separated in regions based on their features including DVR operational keys, pan, tilt, and zoom camera device (PTZ) keys, numerical keys, and PTZ buttons.

DVR operational keys	
MENU	Setup menu
ESC	Escape/exit/stop buzzer
ZOOM	Digital video 5X or 9X zooming
REC	Record/stop recording
FREEZE	Live video freeze
	Pause
	Playback
	Stop
	Fast forward
	Fast rewind
CH+	Next single channel
CH-	Previous single channel
	4 split display
	9 split display
	16 split display
SEQ	Sequential display
AUDIO	Audio/mute
BACKUP	Video backup
DVR	Addressable DVR control

Auto Pan	Perform auto pan feature		Move up/tilt up
Zoom in	Zoom in of a fast dome camera		Move down/tilt down
Zoom out	Zoom out of a fast dome camera		Move left/pan left
Preset	Call preset of a fast dome camera		Move right/pan right
			Enter/set
0 to 9	Numerical keys		

Chapter 1-5. Mouse System

The DVR has both USB mouse interface. General mouse operations are described as below:



Left mouse click—In mouse menu system, mouse click can select a menu item. In window-division mode, click on a camera that is to select the camera in activation mode (active camera).
Left mouse double click-- In window division mode, click on a camera that can call the camera in full screen mode.
Mouse drag—In motion area setup mode, mouse drag can setup a motion area.
Mouse scroll—In setup menu, mouse scroll can increase or decrease a value.
Right mouse click—Popup a submenu system or return to live in main menu.

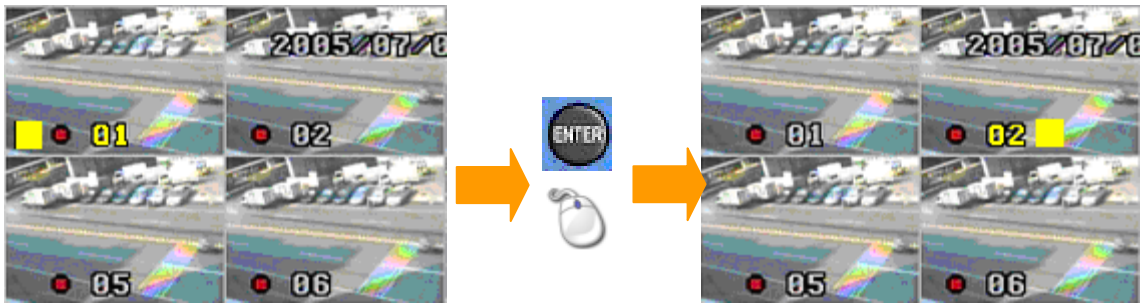
Chapter 1-5-1. Mouse Menu

For using mouse menu, please use the mouse click on Menu item. The mouse menu shows on the screen for more system features.

SETUP
PLAYBACK
ZOOM
PTZ
AUDIO ON/OFF
SHUTDOWN

Chapter 1-6. Active Camera

Active camera is shown as checked at camera name/number. Once a camera is activated, the camera can be controlled for PTZ operation or for camera audio. Moving the active camera sequentially, one can simply press the Enter button on the remote controller, the keypad, or keyboard(s).



Chapter 1-7. Symbols & Icons

The DVR adopts symbols and icons for graphical user interface (GUI) design. These symbols and icons contain useful information in operating the DVR. All the symbols and icons are discussed in the rest of the chapter.

Task bar

The task bar shows up on bottom of the main monitor for indicating the operation status of the DVR while operating the remote controller, the mouse, the keypad, or a keyboard.

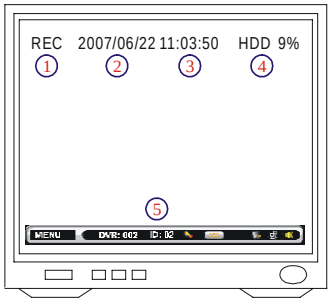
The icons of the DVR are described in the follow table:

Mouse menu	MENU
Controlled DVR ID/RS-485 ID	DVR: 002
The DVR's ID/RS-485 ID address	ID: 02
Manual recording mode	
Schedule recording mode	
Zoom mode	
Sequence mode	SEQ

CHAPTER 2. DVR OPERATIONS

Most of the time, DVR is operated at the surveillance/live mode. In live monitoring mode, the information of screen layout and symbols are described in this section.

SCREEN LAYOUT



① Recording indicator

② Date

③ Time

④ HDD recording percentage

⑤ Task bar

Chapter 2-1. Sequential Display

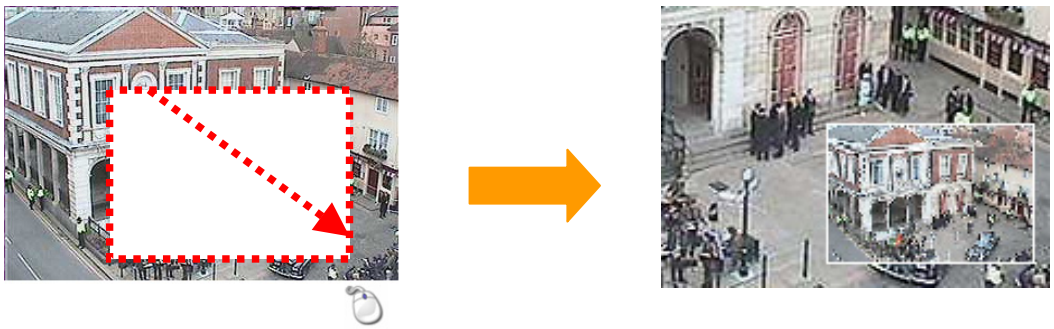
The DVR provides multiplexer feature displaying each camera in full screen sequentially in specific time period. To perform sequential display, simply press SEQ button on the remote controller or a keyboard. The sequence icon shows on the task bar for indicating the DVR is in sequence status. To perform sequence using mouse, please click on Mouse Menu->Sequence.

Chapter 2-2. Freeze

In live monitoring and playback modes, the DVR provides screen-freezing feature in which suspicious individuals can be determined. To freeze the screen, press Freeze button on the remote controller. Press the button again to cancel this operation.

Chapter 2-3. ROI & PIP Mode

The DVR provides 5X and 9X digital zooming (ROI) capability live monitoring and video playback modes. To perform this feature, press Zoom button on the remote controller. Once the DVR is in zooming status, press Up, Down, Left, or Right buttons to move the zooming window around to view other portion of the channel. Press the Zoom button. It can perform 5X digital zoom, 9X digital zoom, and normal view screen in sequence.



To perform ROI feature using a mouse, please first perform mouse drag for zoom mode. Once the video is in zoom mode, scroll mouse can perform 5X digital zoom, 9X digital zoom, and normal view screen.

5X digital zoom

9X digital zoom

Note: Only 4-Ch DVR supports digital zoom with PIP feature.

Chapter 2-4. CH+ & CH-

In case of scanning through cameras in full screen, channel buttons, CH+ & CH- can be used to monitor all cameras.

Chapter 2-5. Audio & Mute

Once the audio channel is properly setup, the DVR can output the live audio. To enable live audio, press Audio button. To disable live audio, one can press Audio button.

Chapter 2-6. Addressable DVR Control Button

To control one of the DVRs using only one remote controller, please press on the addressable DVR control button followed by the DVR ID. The rest of the DVRs are in sleeping mode until one of the DVRs gets called.

Chapter 2-7. OK/Cancel Button

The DVR has OK/Cancel operation in menu/submenu system. To perform this operation, the user can press Menu for OK or ESC for cancel on the keypad or the remote controller. For keyboard, please press SET button for OK or CANCEL button for cancel.

CHAPTER 3. PTZ CONTROL

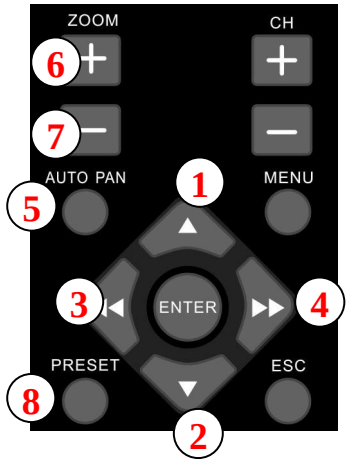
PTZ device can be controlled in live monitoring mode and PTZ setup mode via the keypad and/or the remote controller. The rest of the chapter describes the ways of controlling PTZ devices using the keypad and a remove controller.

Chapter 3-1. Instant PTZ Controllable Mode

Instantly controllable PTZ camera (active camera) is shown in yellow color in live monitoring mode indicating that the camera can be instantly controlled for PTZ operations. Moving the active camera sequentially, one can simply press the Enter button on the remote controller. Once a camera is in active mode (text in yellow), major PTZ features can be easily performed.

Chapter 3-2. Remote Controller & PTZ

PTZ buttons are framed in yellow that contain auto panning, zooming, and zooming out. Other PTZ and DVR buttons are shown in blue on remote controller. The details are described as below:



① Tilting the PTZ device up
② Tilting the PTZ device down
③ Panning the PTZ device left
④ Panning the PTZ device right
⑤ Perform auto panning of the PTZ device
⑥ Perform zooming in of the PTZ device
⑦ Perform zooming out of the PTZ device
⑧ Calling presets

Chapter 3-3. Recall Presets

To call a preset, please follow the following instructions:

- Press Preset button to enable the calling preset mode.
- In Preset mode, preset 01 to 64 directly to recall preset points of the PTZ device.

CHAPTER 4. RECORDING

Chapter 4-1. Start Recording

The DVR automatically performs recording task after power on. Press REC button on the keypad or the remote controller that it can change the recording mode from schedule recording to manual recording. Press REC button again. DVR returns back to schedule recording again.

Chapter 4-2. Manual Recording

Manual recording is equivalent to emergency recording. In manual recording mode, the DVR records all the cameras based on recording frame rate. In many cases, there might be a situation. A user might want to record all the cameras for suspicious events. Manual recording can now be used for an emergency. If there are motion triggerings or alarm switches set for the DVR, the events can be recorded in the DVR's event log.

Chapter 4-3. Schedule Recording

For storage consideration, there are many applications that may be required to record video after motion triggering or alarm activations. Schedule recording can be used that the DVR records video based on motion or alarm triggering for certain hours. The schedule table can be preprogrammed to meet the recording requirement.

Chapter 4-4. Alarm Switch Activation Recording

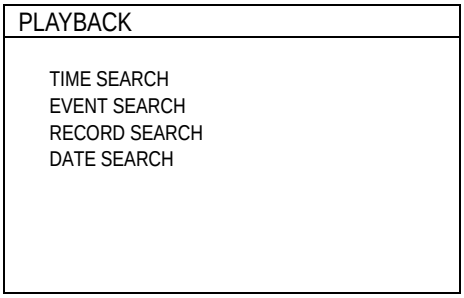
Recording operation can be triggered by an external alarm switch. An external alarm switch can activate the DVR for recording. Proper settings such as Alarm Rec Duration and activation type (N/O or N/C) should be configured before operation. Once one of the alarm switches gets triggered, the alarm icon (bell) shows at the bottom of each camera channel.

Chapter 4-5. Motion Detection Recording

Motion detection is very useful feature of the DVR that the intrusion detection of a camera can be detected. Motion detection recording sensors motion variation, and it triggers the DVR to perform recording task. Once motion detection is activated, the motioned channel shows an alarm icon (little man) on the screen to inform users.

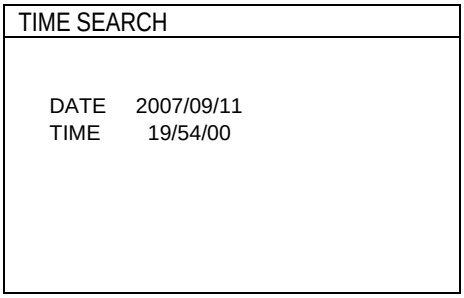
CHAPTER 5. PLAYBACK

To playback, please press Play button on the remote controller, a keyboard, or the keypad. A playback message box shows up for searching video clips. The details are described in the following sections:



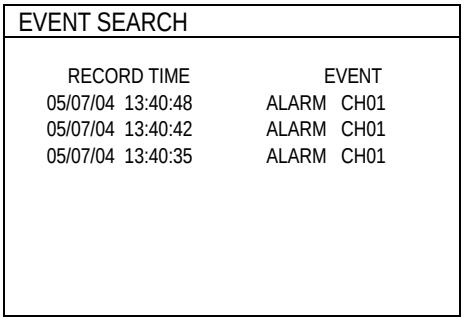
Chapter 5-1. Time Search

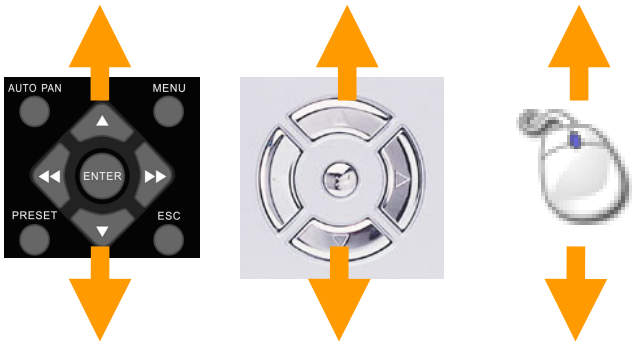
Time search feature can perform date and time search based on recorded video data. This feature is very easy-to-use, and it allows a user to perform video searching task throughout hard disk drives. To perform time search operation, simply press Left or Right button on the highlighted date or time field. To change the date and time, please press Up or Down button.



Chapter 5-2. Event Search

Event list contains information including date, time, event type, and camera channel for the event. There are external alarm event and motion alarm event that can be found in event list. To filter out events, please set starting and ending time in the event search dialog box. To view operation log, please see System->Log View for detail.

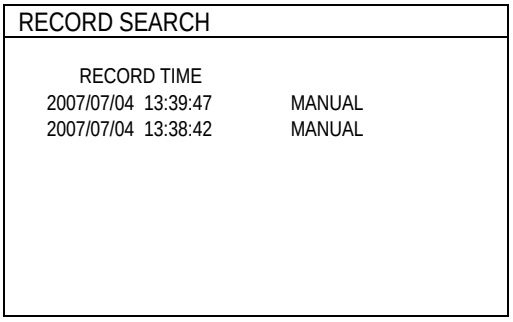




- To select an event list item, press Up or Down button.
- Press Enter button to play the video clips
- To select next page, please press FF or FR button

Chapter 5-3. REC Search

REC SEARCH contains the list when a user presses REC button to activate manual recording operation. To play the REC Search list, please select Record Search item. A list of start recording shows up accordingly. Press Up or Down button to select list item for playback.



Chapter 5-4. Time Search

User can also use calendar and time for performing video search feature.

Chapter 5-5. Other Playback Features

Once one of above playback features is performed, features such as fast forward (FF), fast rewind (FR), pause, stop, step, and re-play can then be used.

FF: Press Right button, shuttle ring right on the front panel, or FF key on the remote controller to fast forward the playing video. The speed of fast forwarding is range from 2X ~ 6X of the original playback speed.

FR: Press Left button, shuttle right left on the front panel, or FR key on the remote controller to fast rewind the playing video. The speed of fast rewinding is range from 2X ~ 6X of the original playback speed.

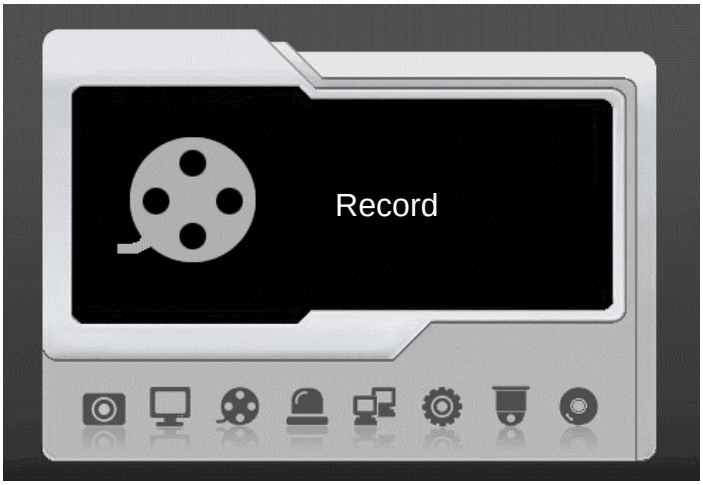
PAUSE & STEPPING: press Pause button while playing video that can pause the video. Once the video is in pausing mode, one can press Left or Right button on the DVR's keypad or the remote controller to play the video step-by-step.

STOP: To stop video playback, press Stop button on the keypad or the remote controller. The DVR's screen switches back to playback main menu for other playback operations. Press ESC button again that it returns to live monitoring mode.

CHAPTER 6. MENU SYSTEM

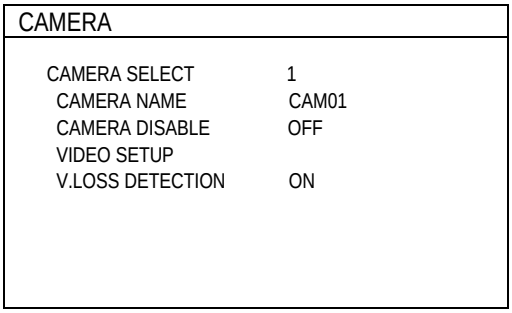
Chapter 6-1. Setup Menu

Setup menu contains menu settings for camera, monitor, record, alarm, system, network, PTZ, and backup. The details of all the setup menu items are described in the rest of the chapters.



Chapter 6-2. Camera Setup

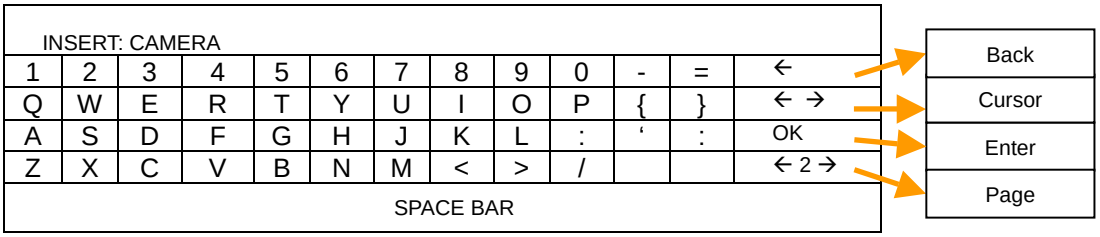
A user can setup camera settings at camera setup option. Camera name, video setup, and video loss detection can be found at this option.



Chapter 6-2-1. Camera Name

A user can edit up to 12 characters for a camera name. To setup the camera name, please type the character using visual keyboard and press **Enter** button.

Visual Keyboard

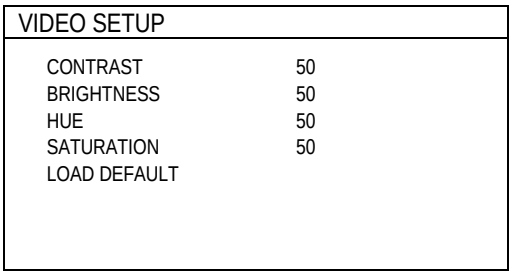


Chapter 6-2-2. Camera Disable (Secured Recording Channel)

Channel enable feature can disable the live video of a camera. The channel can still perform video recording. For privacy or security considerations, irrelevant people may be prohibited to see the live video.

Chapter 6-2-3. Video Setup

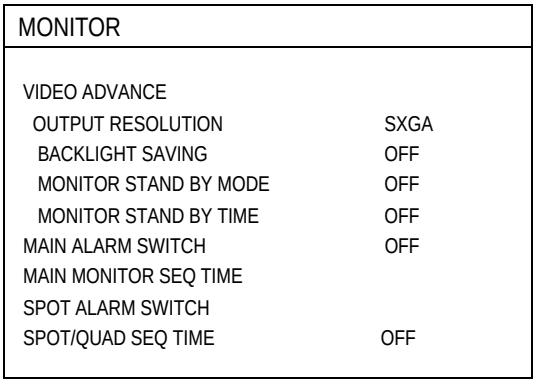
Video setup can adjust video's contrast, brightness, hue, and saturation for each camera. To restore the default setting, please press Load Default menu item.



Chapter 6-2-4. Video Loss Detection

To enable or disable video loss detection, please set this option to be On or OFF. If the video signal is unstable and causes video loss, a user can disable this option. Unstable video signal may generate thousand of video loss events in one second. Temporarily turn this option Off that can improve DVR system performance.

Chapter 6-3. Monitor Setup



Chapter 6-3-1. Video Advance

To setup advanced LCD/VGA video setting, please following this section.

VIDEO ADVANCE	
ADAPTIVE DEINTERLANCE	ON
EDGE PRESERVING	ON
MOVING OBJECT CORRECTION	ON
FILE MODE	ON
SHARPNESS ENHANCER	OFF

Each of the VGA settings is described in the following table:

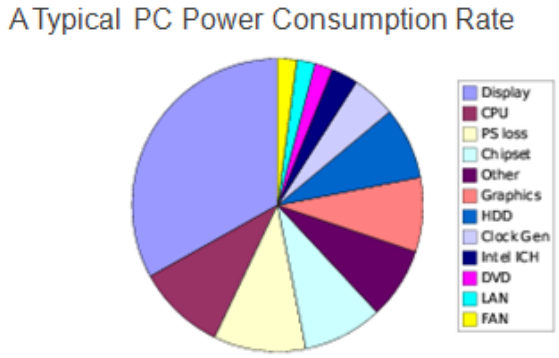
	OFF	ON
Adaptive de-interlacing		
Edge preserving		
Moving object correction		
Film mode		
Sharpness enhancer		

Chapter 6-3-2. Output Resolution

VGA output resolutions can be set at this option.

Chapter 6-3-3. Backlight Saving

DVR/NVR is 24 hours non-stop running. LCD panel consumes the most energy to a typical PC. The following figure shows LCD panel consumption rate.



Backlight saving mode is to turn the LCD backlight darker. Turn backlight of the LCD can also save LCD power consumption.

Chapter 6-3-4. Monitor Standby Mode

After stand by time of the main monitor, LCD monitor is in sleep mode to save power consumption. To reactivate the LCD monitor, please enable alarm/motion detection, move DVR's mouse, press any key on the front panel, or press any key on the remote control.

Chapter 6-3-5. Monitor Standby Time

To setup standby time, please change the time at this feature.

Chapter 6-3-6. Main Alarm Switching

The main monitor output can be configured in displaying camera's full screen. To enable this feature, please select the camera in camera selection box.

Chapter 6-3-7. Main Monitor SEQ Time

Sequence feature can multiplex each camera screen in full size in specific time period. Once the sequence time is set, press SEQ button on the remote controller or the keypad to activate the sequence feature.

Chapter 6-3-8. Spot Monitor Switching

The DVR has a spot output. To setup the sequence, please first assign spot or quad output. Specify SEQ TIME in seconds. Once above has been setup, spot monitor starts to perform sequence display.

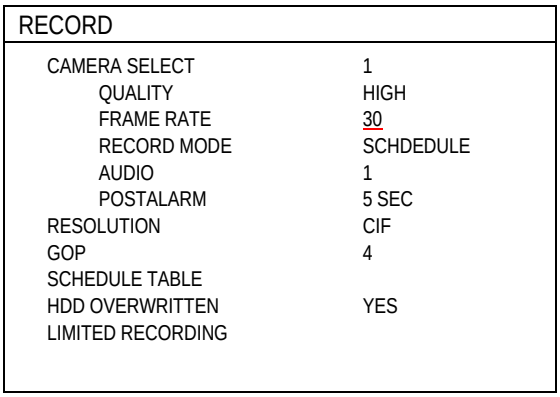
Chapter 6-3-9. Spot Sequence Time

To specify Spot sequence time, please set this option.

Note: Spot monitor is for 8/16-Chananel only.

Chapter 6-4. Record Setup

Record setup menu can setup features related to recording features such as recording quality, frame rate, recording mode, audio selection, alarm recording, recording resolution, group of pictures (GOP), schedule table, HDD overwritten, and limited recording.



Chapter 6-4-1. Record Quality

The recording quality can be configured for each channel. To change the quality setting, press Left or Right button.

Chapter 6-4-2. Frame Rate

Each camera channel can be setup for its frame rate individually. To setup the frame rate, please press the Enter button and using the Left or Right button for the adjustment.

Chapter 6-4-3. Recording Mode

Each camera can be setup for schedule recording or no recording. Once the recording mode has been turned off, each recording mode including alarm, motion, or manual recording does not record.

Chapter 6-4-4. Audio

There are up to four audio inputs that can be recorded into the DVR. To setup audio recording, please assign the audio channel to a particular camera.

Chapter 6-4-5. Post-alarm Recording

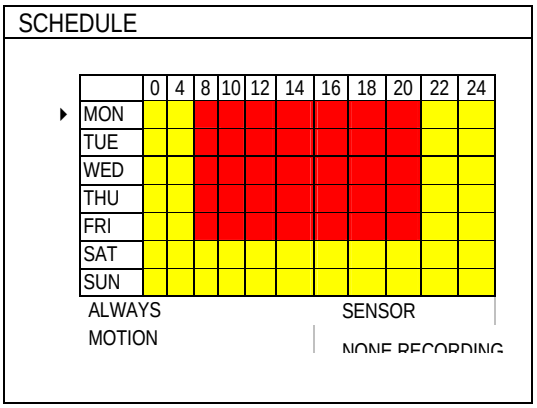
Post-alarm recording can record the video of a camera after a particular alarm/motion is triggered. To enable post-alarm recording, please set the post-alarm recording seconds for this option.

Chapter 6-4-6. Resolution

The DVR can provide full D1 or CIF recording solutions. The default setting is at full D1 recording. To change recording resolution, please press Left or Right button.

Chapter 6-4-7. Schedule

Once the schedule has been setup, the DVR can record camera video based on the schedule table. The DVR's timer detects every second to check if it should start to record. To edit the schedule table, a user can press Enter button for editing mode. Press Enter button that can change recording mode, always, sensor, motion, or no record. For the Apply All setting, the user can use Up or Down button to select Apply All menu item. Press Enter button on" Apply All" menu item that can setup a recording mode for a week.



Chapter 6-4-8. HDD Overwritten

The DVR can be setup for HDD circular recording. If the user does not want the HDD to be overwritten, please turn the option to be off.

Chapter 6-4-9. Limited Recording

In many countries, the HDD recording may be limited and can be only accessed for a certain period. Once the recorded data passes the period, the data can no longer be accessed.

Chapter 6-5. Alarm Setup

Alarm setup menu allows changing the settings of extern alarm switches, motion alarm, buzzer, and alarm recording duration. To change these settings, please enter Alarm setup menu and follow the instructions:

ALARM	
CAMERA SELECT	CH01
ALARM INPUT TYPE	OFF
ALARM ENABLE	OFF
MOTION SENSITIVITY	OFF
MOTION AREA SET	NORMAL
MOTION BUZZER TIME	05 SEC
ALARM TIME	05 SEC
BUZZER	ON
BUTTON SOUND	ON

Chapter 6-5-1. Alarm Input Type

The DVRs' alarm inputs can be configured as normal open (N/O) or normal close (N/C). The alarm input is one-to-one mapped to a camera respectively.

Chapter 6-5-2. Motion Enable

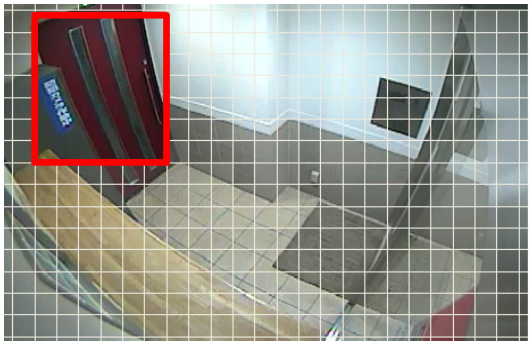
Motion Enable enables motion alarm activation, if the motion area has been set with proper motion sensitivity. Press Left or Right button at Motion Enable menu item to change the setting.

Chapter 6-5-3. Sensitivity

There are eight levels of sensitivity adjustable for motion alarm triggering, range from Very High to Very Low. Press Left or Right button to change the sensitivity setting.

Chapter 6-5-4. Motion Area Set

There are few ways to setup motion area. The detail setup sequence is described as follows:



	Keypad	Keyboard	Remote controller	Mouse
Step 1	Enter Motion Area Set menu item.			
Step 2	Press Up, Down, Left, or Right to move cursor			Move mouse for starting position.
Step 3	Press Enter to define starting area.			
Step 4	Press Enter again to finish a motion detection zone.			Mouse-drag for an area.
Step 5	To clear motion zones press Menu button			Double-click for clear motion zones.
Step 6	Press ESC for exit the setting menu.			Right-mouse click for exit motion zone setting.

Chapter 6-5-5. Alarm Time

Motion alarms and external alarm inputs can trigger the buzzer alarm. Buzzer time is adjustable from 0 to 99 sec. Press Left or Right button on Buzzer Time to adjust the time setting.

Chapter 6-5-6. SMTP Setup

DVR is capable of sending alarm JPEG snapshots to email account if motion or alarm gets triggered. To enable this feature, please type in the email account information.

(Only limit to intranet network)

Chapter 6-5-7. Buzzer Enable

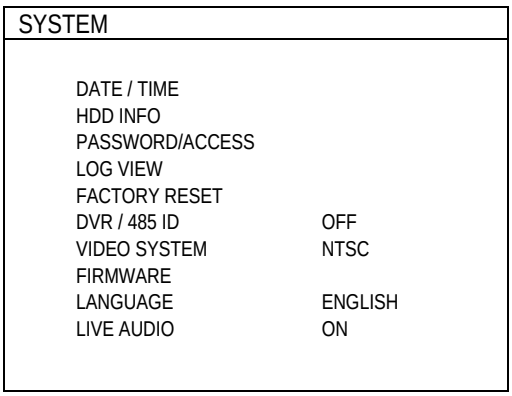
In case, the warning buzzer requires to be turned off. A user can disable the buzzer under System->Buzzer Enable menu item.

Chapter 6-5-8. Button Sound

To enable or disable button sound, please set button sound option.

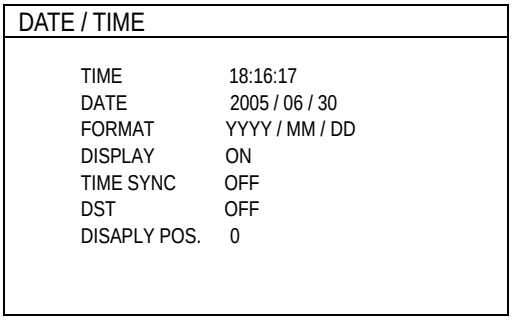
Chapter 6-6. System Setup

The DVR system related settings such as date/time, HDD, password, log, restoring manufacturing default, DVR/RS-485 ID, video system, firmware update, language, and health check can be configured at this system menu. To setup above features, please follow the following instructions:



Chapter 6-6-1. Date/Time

The DVR has built-in timer to record time information. One can choose different time format or disable the timer.



Time Sync

Time Sync feature allows the DVR to synchronize its timer system to PIH-931D keyboard. To synchronize DVR's timers to a PIH-931D keyboard, please set this option to Keyboard. PIH-931D keyboard starts to synchronize every 15 minutes.

NTP

To use NTP time sync, please select NTP service at Time Sync selection. The DVR will automatically synchronize with an NTP server.

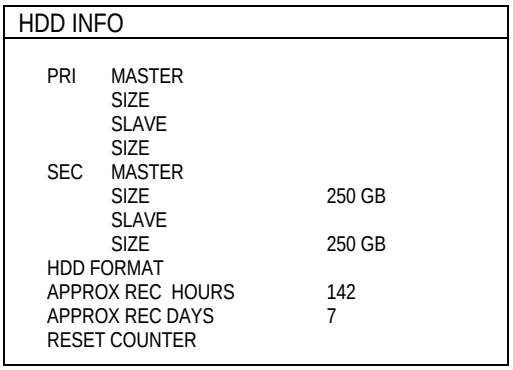
Warning: Highly recommend to perform Time Sync feature before the DVR starts to record video.

Warning: Highly recommend to re-format HDD, if the timer has been set and the HDD has recorded video data.

Chapter 6-6-2. HDD Information

HDD INFO shows the following information:

1. Size—The capacity of the hard disk drive
2. Approximate recording hour—recording hours based on the HDD(s)
3. Approximate recording days—recording days based on the HDD(s)
4. Average frame size—Average picture size

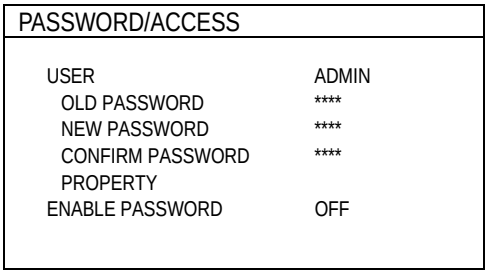


HDD Format

To format HDDs, please select HDD Format menu item. Password is required for preventing unauthorized access. A warning message also gets prompted for formatting verification. Please be alerted to this operation. It may erase not only event list data but also recorded video data. Press Enter button at HDD Format menu to format the hard disk drives. Formatting hard disk drives may take several seconds based on the number of lists recorded.

Chapter 6-6-3. Password/Access

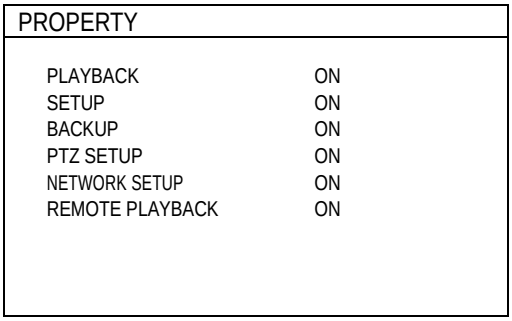
The DVR has three sets of password protection (accounts) preventing unauthorized access. To activate password function, please turn Enable Password on or off at System->Password. The password consists of four to eight digits for entering the DVR. The default passwords are admin, “1111”, operator, “2222”, and guest, “3333”. The acceptable characters are 1 to 10 (0) and A to Z. To change the password setting, please press Enter at System->Password->Change Password.



Note: In case, forgetting your password, please contact your sales agent for master password.

Access Property

Each account can be assigned for access rights including video playback, menu setup, video backup, PTZ setup, network setup, and remote network playback. For an administrator, she or he can manage various access rights for other users.



Chapter 6-6-4. LOG View

Operational log, video lose event, abnormal power off, and other DVR events can be reviewed by LOG View menu item.

Chapter 6-6-5. Factory Reset

A user may want to restore manufacturing default settings. A confirm message shows up for final verification. To perform this task, please select Factory Reset at System->Factory Reset and press Enter button.

Note: Factory reset does not affect IP address, video system, and language settings.

Chapter 6-6-6. DVR ID

Each DVR can be assigned by a unique DVR ID accessed by the remote controller. With a unique DVR ID set, the remote controller issues commands to a particular DVR. The rest of DVRs are in sleep mode.

To operate addressable DVR control feature, please refer to chapter 1 Addressable DVR Control Button.

Chapter 6-6-7. Video System

The DVR supports both NTSC and PAL video systems. The DVR allows switching from one video system to another without rebooting. To change video system, press Left or Right button at System->Video System.

Chapter 6-6-8. Firmware Update

Firmware update allows one to upgrade the DVR's firmware for improving system performance. To perform firmware update, press Enter on Setup->System->Firmware Update. There are two ways to perform firmware update via (1) USB flash disk at DVR site and (2) HTML interface via network.

To perform firmware update using USB flash disk, please follow the instructions:

(1) Plug in a portable USB disk at the DVR's USB port.
(2) Press Enter button at Start Update Firmware.
(3) After finishing transferring, remove the USB device and reboot the DVR.

Prepare Firmware

To prepare firmware update, please create a directory, firmware, in the USB flash disk. The USB flash disk should contain file system FAT-16 or FAT-32. Please visit the web site at www.meritlilin.com to download the latest firmware and save the file in the directory mentioned above.

Start Update Firmware

To perform firmware update, please plug in the USB flash disk into the DVR. Select Start Update Firmware menu item and press Enter button. It will automatically transfer the firmware into the DVR. After transferring firmware, wait until "Please Reboot System" message gets prompted and reboot the DVR.

Export Setup

Export setup feature allows a user to export internal configuration into a system file, at USB flash disk's firmware directory. The file can later be imported to other machines. The imported machine's internal configuration gets updated based on the original DVR's configuration. To perform Export Setup, please select Export Setup menu item and press Enter button.

Import Setup

To perform Import Setup feature, please select Import Setup menu item and press Enter key. The configuration of the DVR gets updated based on the system file.

Version

Version menu item indicates the current version number of the DVR.

Chapter 6-6-9. Language

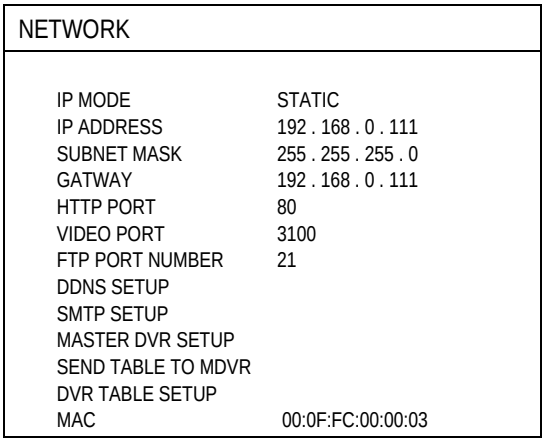
The DVR provides multi-language OSD support. A user can change his/her preferred language to operate the DVR. Press on Left or Right button to change the Language setting.

Chapter 6-6-10. Live Audio

To turn on or off live audio monitoring, please set Live Audio option.

Chapter 6-7. Network

The DVR allows a user to access the video via Internet or LAN. In order to connect to LAN or Internet, subnet mask, gateway, and IP address should be configured. Please consult your Internet provider or system administrator for above information.


NETWORK
IP MODE STATIC
IP ADDRESS 192 . 168 . 0 . 111
SUBNET MASK 255 . 255 . 255 . 0
GATWAY 192 . 168 . 0 . 111
HTTP PORT 80
VIDEO PORT 3100
FTP PORT NUMBER 21
DDNS SETUP
SMTP SETUP
MASTER DVR SETUP
SEND TABLE TO MDVR
DVR TABLE SETUP
MAC 00:0F:FC:00:00:03

Chapter 6-7-1. IP Mode

The DVR provide static, DHCP, and PPPoE IP modes. It is highly recommend to access DVR in high bandwidth network such as LAN.

Chapter 6-7-2. HTTP & Video Port Numbers

For Internet connection, port number IP mapping technologies can be used for single IP address shared by multiple devices via a network router. Please consult your network administrator for this advanced network technique. HTTP Port number is the web service port number of the DVR.

Note: Default Internet port numbers for the DVR are port 80 (HTML web pages) and port 3100 (video port)

Chapter 6-7-3. FTP

FTP port number is for FTP download video files into a local PC.

Chapter 6-7-4. DDNS

To use domain name provided by DDNS server ddnsipcam.com or www.dyndns.org, please first visit ddnsipcam.com to register an account. After registration, please enter “host name”, “username”, and “password” in DDNS menu item at DVR side.

Note: Please use lower case for “host name”, “username”, and “password” for both DynDNS registration and DVR settings.

Chapter 6-7-5. PPPOE Setup

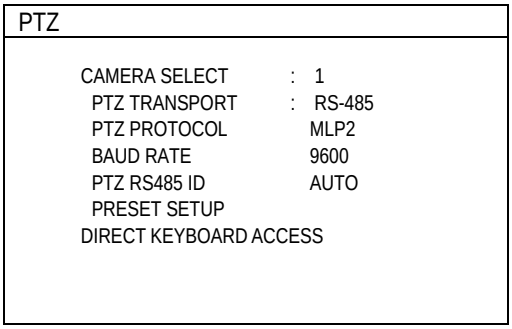
To use ADSL modem, please enter the " username" and " password" for dialing the ADSL modem connection successfully。

Chapter 6-7-6. MAC

Display the MAC address of the DVR.

Chapter 6-8. PTZ Setup

The DVR can control RS-485 PTZ or IP PTZ. Using DVR's keypad or the remote controller can access all these cameras. To setup PTZ connection, please follow the following instructions:



Chapter 6-8-1. PTZ Transport

PTZ Protocol is sent to a remote camera by using RS-485. To enable feature, please set the PTZ Transport to RS-485.

Chapter 6-8-2. PTZ Model & Baud Rate

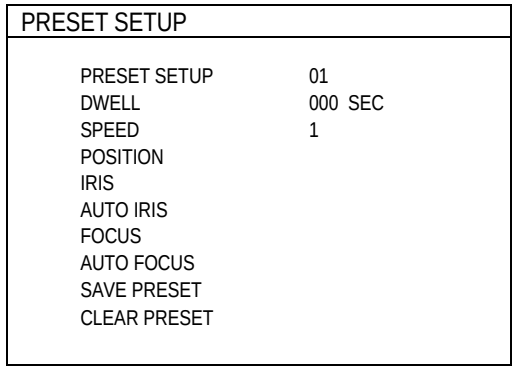
If PTZ protocol is transmitted via traditional RS485 wires attached to the DVR. Please setup baud rate and RS485ID respectively.

One can choose the model of PTZ devices by pressing Left or Right button. The DVR adopts this PTZ model's protocol and communicates with the PTZ device. Each PTZ device can be assigned by its PTZ protocol with different baud rate.

Model	Baud Rate	Number of Bytes
PIH-7000 (MLP1)	9600	3
PIH-7600 (MLP1)	9600	3
PIH-7625-3 (MLP1)	9600	3
PIH-7625-7 (MLP2)	9600	7
PIH-7622-7 (MLP2)	9600	7
Pelco D	2400~9600	None
Pelco P	2400~9600	None

Chapter 6-8-3. Preset Setup

A preset of a PTZ camera can be configured for manipulation during live monitoring. Panning, tilting, zooming, calling presets, auto panning, and other PTZ features provided by a PTZ camera can also be accessed during live monitoring mode. All the features should be configured before accessing PTZ functions. Please follow the rest of this chapter to setup a preset:



Chapter 6-8-4. Preset

To define a preset, press Left or Right button on the keypad or the remote controller to change the preset number.

Chapter 6-8-5. Dwell

Define dwell of a preset. Dwell number ranges from 0 to 255 (the shortest to the longest).

Chapter 6-8-6. Speed

Define speed of previous preset to the next preset. The speed number ranges from 1 to 8 (the slowest to the fastest). The speed might vary based on different PTZ device's settings.

Chapter 6-8-7. Position

To adjust PTZ lens position, press Enter at Adjust Pos menu item. A PTZ screen keypad shows up as a reminder. Please press Left, Right, Up, or Down button on remote controller to move the PTZ lens. To zoom in and/or zoom out of the PTZ device, press Zoom In.

Chapter 6-8-8. IRIS & Auto IRIS

To adjust IRIS, please press Left or Right button on IRIS option. For auto IRIS, press Enter on Auto IRIS option.

Chapter 6-8-9. Focus & Auto Focus

To adjust focus, please press Left or Right button on Focus option. For auto focus, press Enter on Auto Focus option.

Chapter 6-8-10. Save Presets

Once the above parameters are entered, the lens of the PTZ device should be in place with proper IRIS and focus set. To store the parameters permanently, please press Up or Down button to choose Save menu item. The position gets stored by each PTZ device programmatically. You can test the stored preset by switching back and forth on Preset menu item. To define other preset point, please repeat chapter 6-8-4.

In live monitoring mode, this preset can be recalled at any time. To recall a preset, please read Call Preset section for detail.

Chapter 6-8-11. Clear All Preset

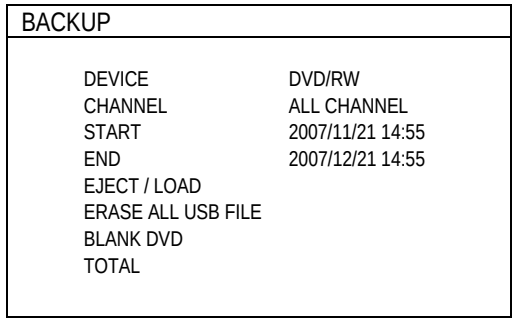
To clear all the preset points of a PTZ device, please select Clear All Preset menu item. Press Enter key on the front panel or remote controller. The operation clears all the preset points.

Chapter 6-8-12. Direct Keyboard Access

Direct Keyboard Access mode allows RS-485 protocol directly transmitted to RS-485 PTZ device. DVR is no longer handle the conversion of the RS-485 protocol.

Chapter 6-9. Backup

The DVR provides various backup methods for performing backup task including USB flash disk, DVD/RW (advanced model), and FTP file download.



To perform backup, please press Left or Right to select backup device type. Press Enter button on Channel option to select backup channel(s). Once the channel(s) has been selected, enter start backup and end backup time. The video size will be calculated in Total field.

For DVD/RW backup, please purchase DVD+RW disk (recommended). Perform Blank DVD feature before starting DVD backup.

Chapter 6-9-1. FTP Download

If backup device is set to File, important backup video can be stored in DVR's temporary buffer. The DVR has 2 GB internal storage space allocated for file backup. The backup files get deleted automatically for the next time the backup task performed again.

To download the backup files, please use FTP program (Backup Manager) to download the video file to your PC. Please provide the account and password as "Admin", "Oper", and "Guest" in the FTP program to download the file(s). The user can also use integrated HTML interface for FTP file download.

Chapter 6-9-2. HTTP File Download

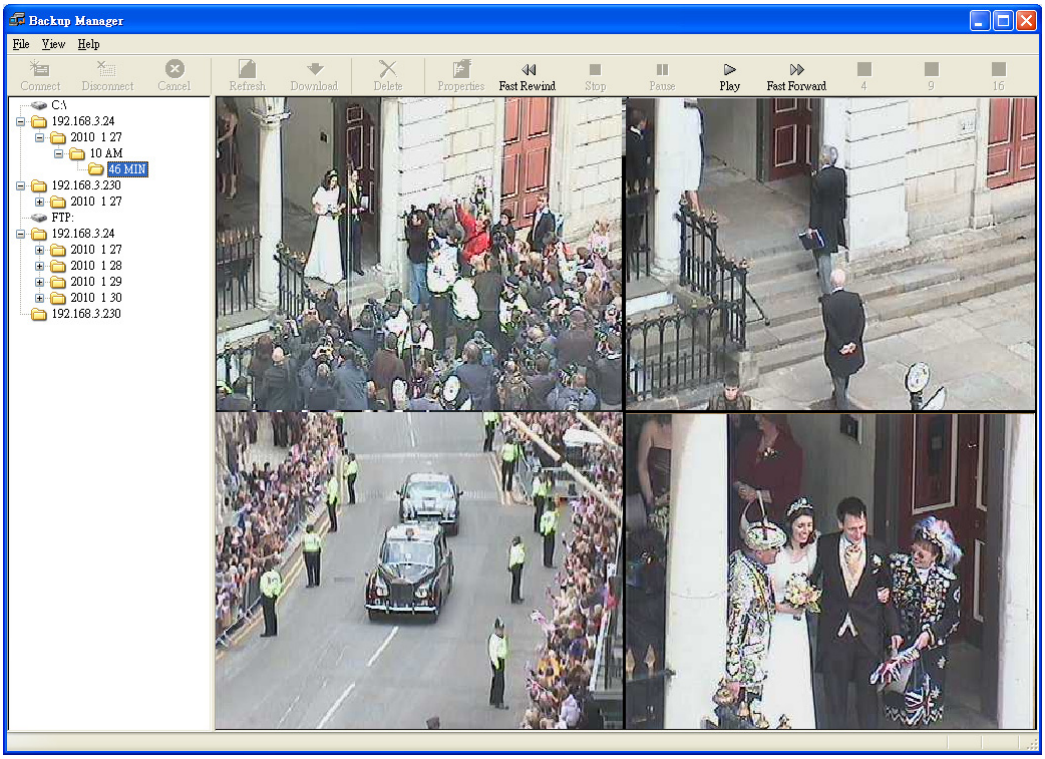
DVR also allow downloading the file from HTTP web page. To use HTTP download, please see network chapter for detail.

CHAPTER 7. FILE PLAYBACK

To play a backup file from a PC, a user can export DVR's video to H.264 file. To review multiple channels playback, Backup Manager (Backupman.exe) built-in in the DVR can be used.

Chapter 7-1. Play H.264 Files

The DVR can export H.264 file to (1) USB flash disk, (2) DVD/RW, (3) File for FTP download (4) HTTP download. To play the exported H.264 video files on a PC, please use Backupman.exe . Backupman.exe can be copied over the backup device whenever the backup task has been performed. The user can also download the application from the DVR's HTML interface.

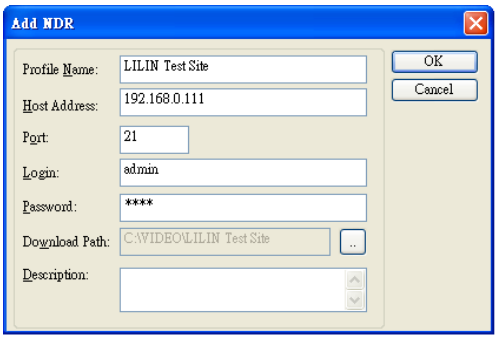


Chapter 7-2. Play H.264 Audio

Double click on a channel in full screen for playing audio.

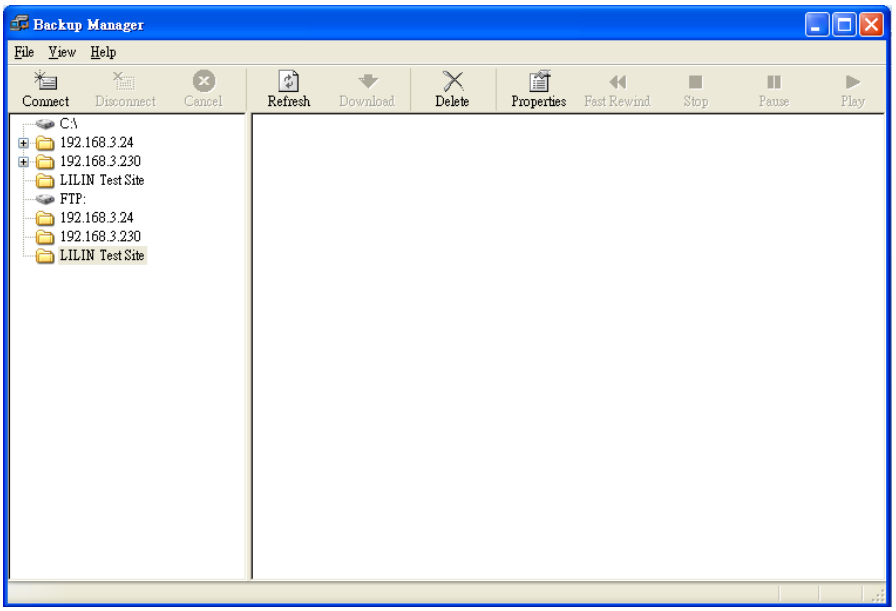
Chapter 7-3. Manage DVRs Download

To manage multiple DVRs file download, please use Backup Manager to download files from DVRs. To perform DVRs file download, please first click on File->Add DVR. It prompts Add DVR dialog box.



Chapter 7-4. Connect to DVR's FTP Service.

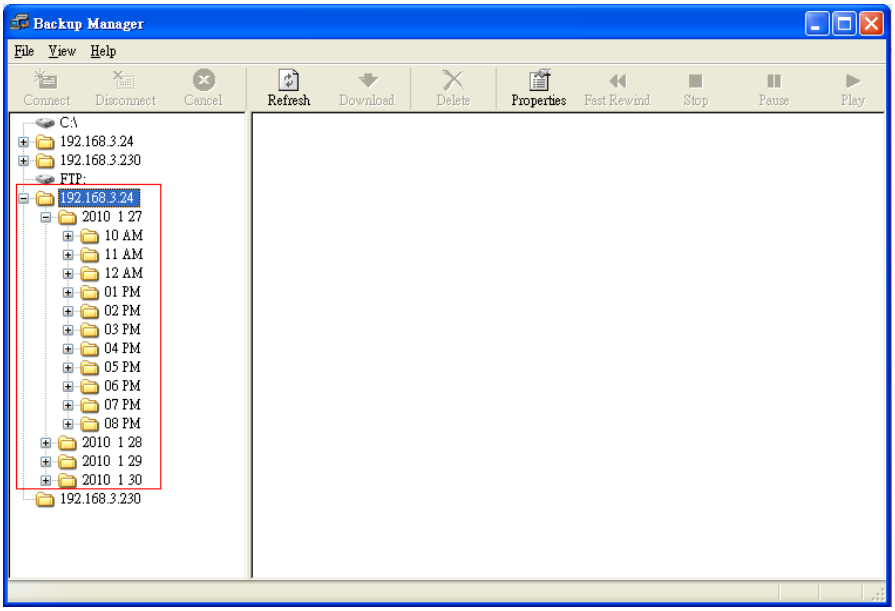
After adding a DVR profile into the Tree View, please click on the Profile and click on Connect button.



Chapter 7-5. Start to Download DVR's Files.

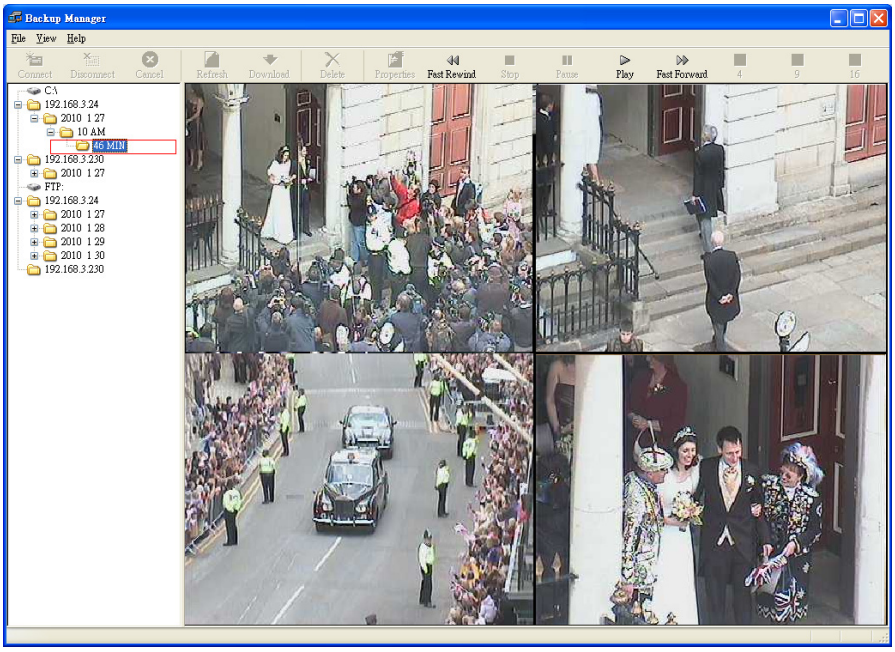
Once a DVR is connected, a list of time stamps of the DVR gets listed in the treeview.

Select one of the stamp and click on Download button to download the files.



Chapter 7-6. Play local DVR's files.

Click on the time stamp of the local driver, the file clips can by playback by clicking on the Play button.

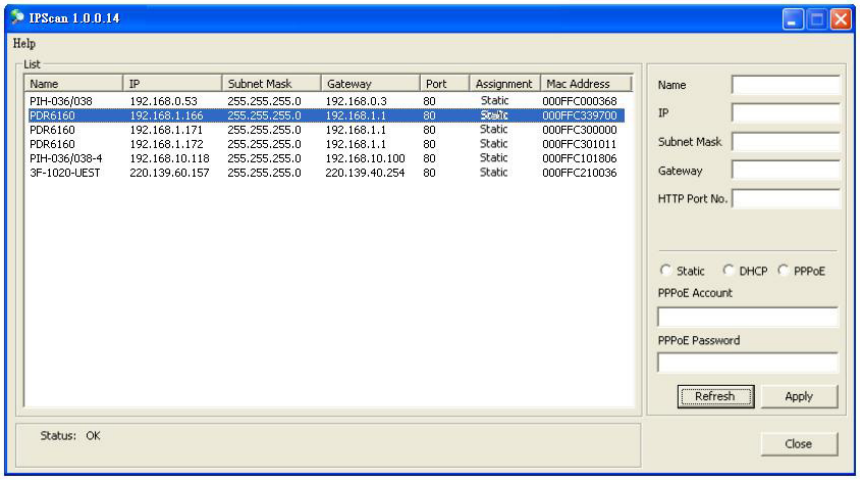


CHAPTER 8. NETWORK

There are two ways to access the DVR via network--Internet browser (web interface) or CMX application. All the features including live monitoring, menu setup, video playback, and file backup can be done by using web interface.

Chapter 8-1-1. Configuration

Make sure that network IP address, subnet mask, and gateway of the DVR are setup correctly. Always, consult your network administrator before installing DVR.



To setup IP address, a user can use IPScan utility to scan all the DVRs within a LAN. This powerful tool can help the user to monitor, to find, and to set IP configuration for all Merit LILIN's IP-based products.

Note: The default IP address of the DVR is 192.168.0.111

Chapter 8-1-2. Internet Ports

To access the DVR via Internet using a router, please make sure that IP Ports of the router (IP sharing device) are set. The DVR uses the following IP Ports by default:

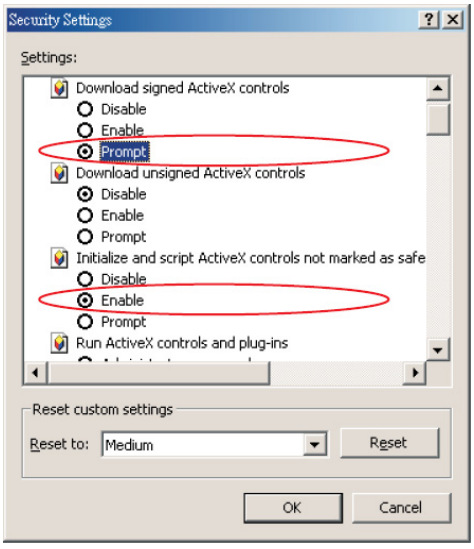
Port 80—HTML web pages
Port 3100—Command port

Chapter 8-2. Access the DVR via Internet Browser

To access the DVR, a user can use Internet browser to get live and stored video via Internet. The DVR's web interface also provides features of PTZ access, split window display, and system configurations. General DVR web interface is described in the following figure:

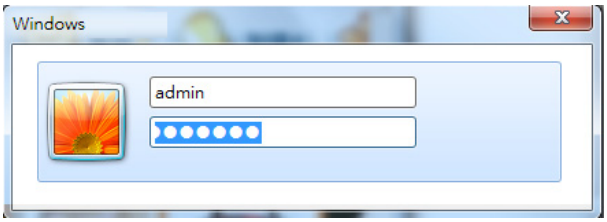
Chapter 8-2-1. Before Using Internet

Make sure that your Internet Browser allows signed ActiveX plug-in running on your PC. Set "Download Signed ActiveX plug-in controls" to "Prompt" and "Run ActiveX control and plug-in" to "Enable" at Internet Explore->Tools->Options->Security Settings.



Chapter 8-2-2. Logon

To logon the DVR, please type in the IP address in the HTTP address box via Internet browser. By default, type “192.168.1.171” in the HTTP address box to access the logon page. Use default password “1111” for Administrator, password “2222” for Operator, and password “3333” for Guest.



Note: Each user can be assigned for different access level at System->Password/Access.

Chapter 8-2-3. Hyper Link Panel

Hyper Link Panel contains major features including video source, configuration, and Backup Manager download page.

Configure the DVR via Web page

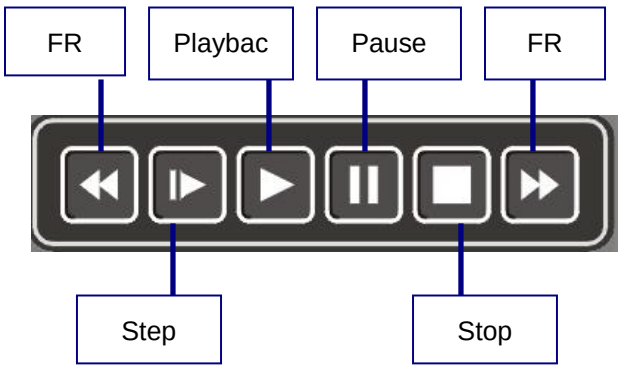
To configure the DVR via web page, please Click on “Configure” hyper link. There are internal server setting, general network setting, PTZ device setting, and video system setting allowed. The detail settings are described in the rest of the chapter.

Download H.264 DVR File Player

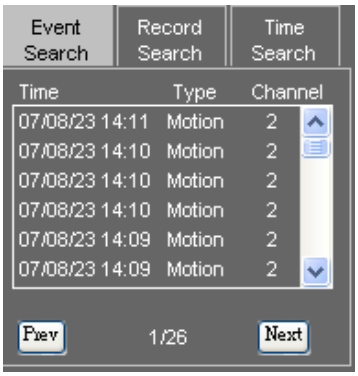
H.264 DVR File Player (Backup Manager) hyper link allows a user to download the application via Internet.

Chapter 8-2-4. Playback Over Network

The DVR allows a user to perform Play, FF, Pause/Step, and Stop operations on a remote DVR. The buttons are described in the following figure:



To perform playback operation, please click on Playback hyperlink. A playback dialog box shows up. Event search list, record search list, and time search are all integrated in the dialog box on the hyper link panel.

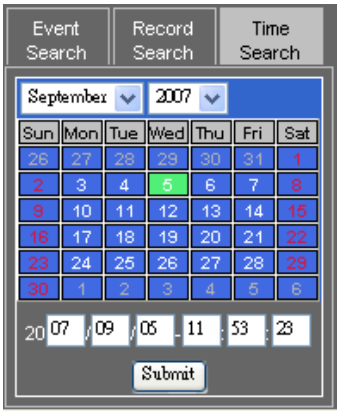


Normal Record and Event Lists

Double click on the record list item or event list item for playback. A user can also click on Search button to retrieve the video.

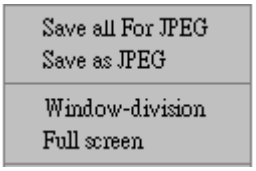
Time Search

Time search feature allows a user to search both master and slave HDDs by date and time. To perform time search function, please specify date and time information in date and time edit boxes. Press Search button to finish this task.



Chapter 8-2-5. Save JPEG file

To save live or playback video to JPEG files, please perform right mouse click on Video Display Control area. In system menu, select Save All as JPEG or Save JPEG for the live or playback video.



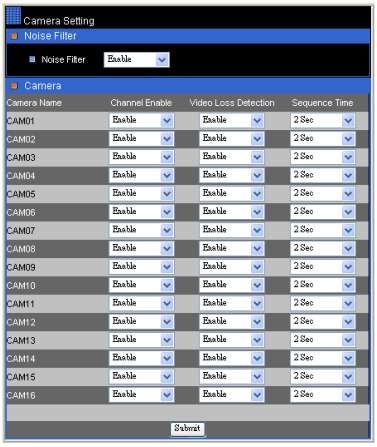
Chapter 8-2-6. Network Audio

The DVR can provide network audio monitoring for both live and playback video. To activate network audio, please open a camera's video in full screen on Video Display Control. It can deliver network audio to a PC for both live and playback video.

Chapter 8-3. Configure the DVR via Web page

Features of the DVR's main menu system can be configured via web interface. Features such as camera, alarm, recording, network, and backup can all get setup remotely.

Chapter 8-3-1. Camera Setting



Channel Enable—Enable or disable live video on main monitor

Sequence Time—Camera sequence time for main monitor

Chapter 8-3-2. Recording Setting

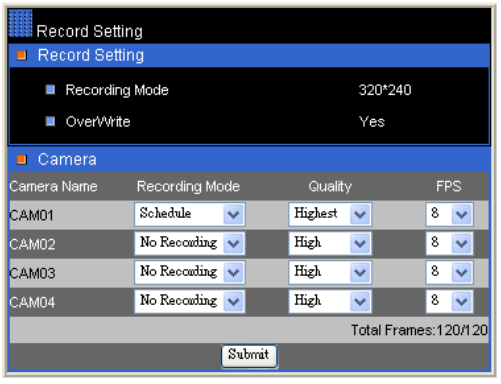
Current Rec Mode—Current DVR recording mode

HDD Overwritten—Option for circular recording

Camera Recording Mode--Assign schedule recording or no recording for a camera.

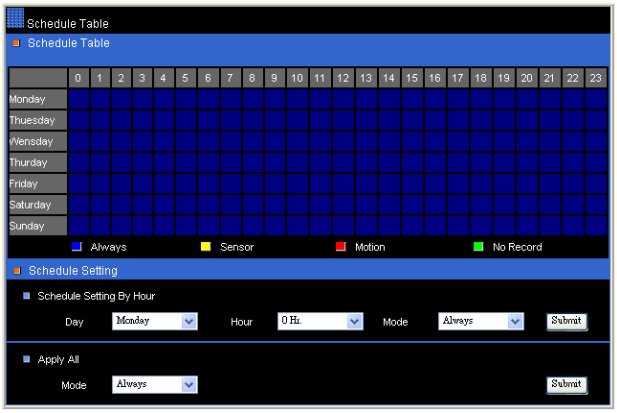
Camera Quality—Setup the recording quality for a camera

Camera FPS—recording frame rate for a camera



Chapter 8-3-3. Recording Schedule Table

A user can setup record schedule table via Internet, to setup scheduling table, please specify day and time with the recording mode. The user can also use Apply



Chapter 8-3-4. Alarm Setting

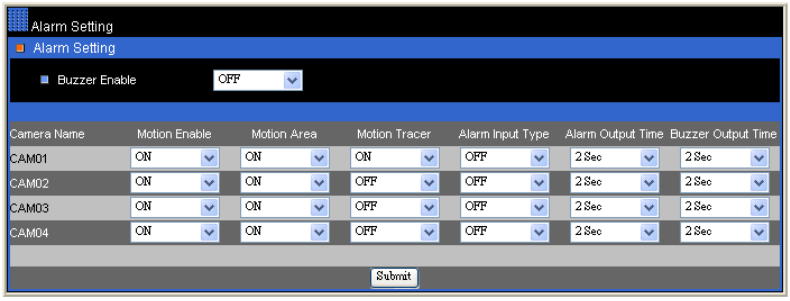
Buzzer Enable—Enable/disable DVR buzzer

Motion Enable—Enable/disable motion detection

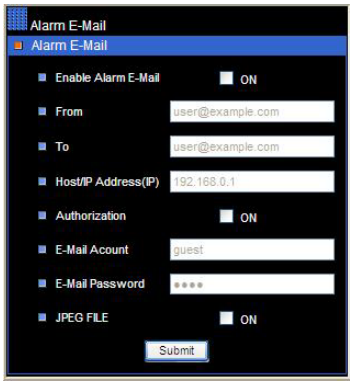
Motion Tracer—Enable/disable motion trace

Alarm Input Type—Set alarm input as NO/NC or disable

Buzzer Output Time—Assign buzzer time for each camera



Chapter 8-3-5. Alarm E-mail



Enable Alarm E-Mail—Option for enable alarm/motion email

From—From E-Mail address

To—To E-Mail address

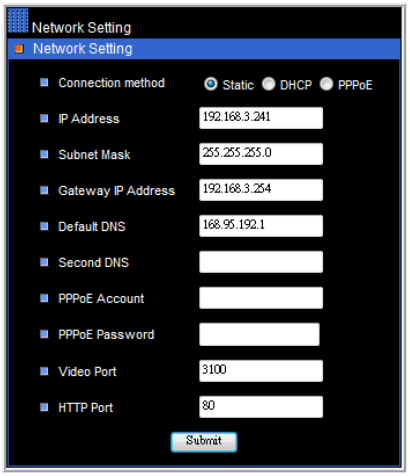
Host/IP Address—SMTP mail server's IP or DNS address

Authentication—Option for user and password authentication

E-Mail Account—receiver's E-Mail account

E-Mail Password—receiver's E-Mail account's password

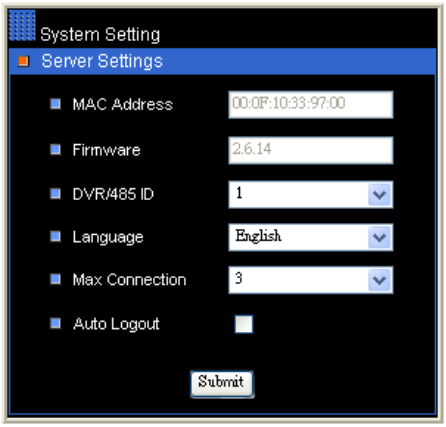
Chapter 8-3-6. Network Setting



IP Addres.s—DVR's IP address
Subnet Mask—Subnet mask
Gateway IP Address—Router/Gateway IP address
PPPoE account—PPPoE protocol account name
PPPoE password—PPPoE password
Video Port—The DVR's video port
HTTP Port—HTML port number

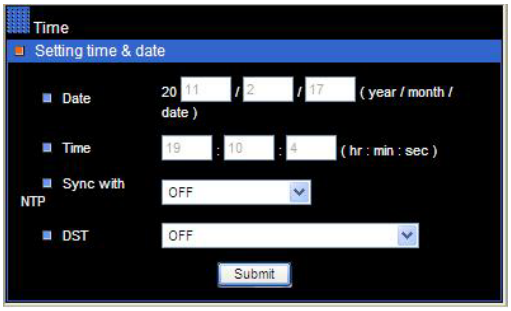
Chapter 8-3-7. System Setting

MAC Address: MAC address of the DVR
Firmware: firmware version of the DVR
DVR/485 ID: Addressable DVR ID for multiple DVRs remote control using remote controller and RS-485 keyboard.
Language: Language selection of the DVR
Max Connections: Maximum network connections allowed for the DVR
Auto Logout: force to logout remote accesses.



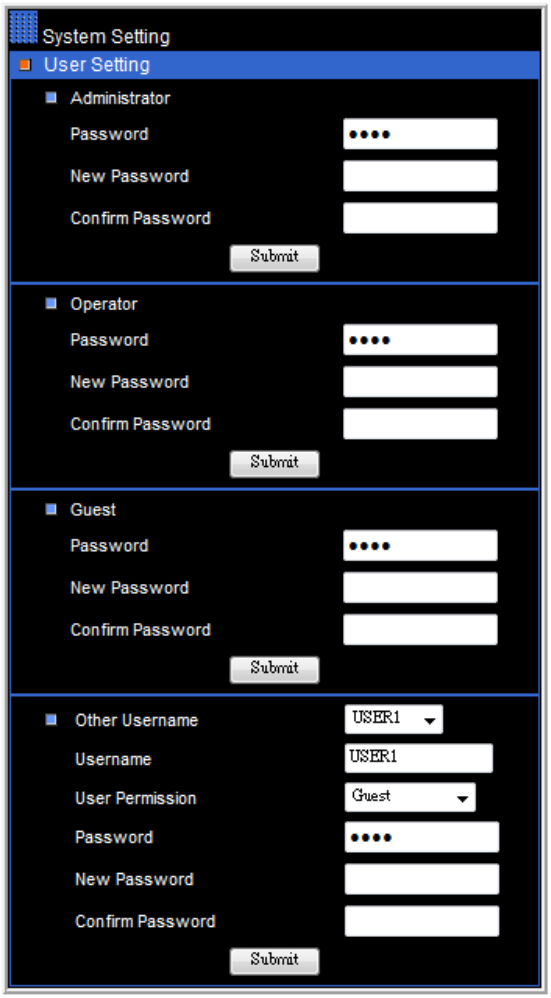
Chapter 8-3-7-1. Timer

Date: Current date of the DVR
Time: Current time of the DVR
DST: Daylight saving time for a region



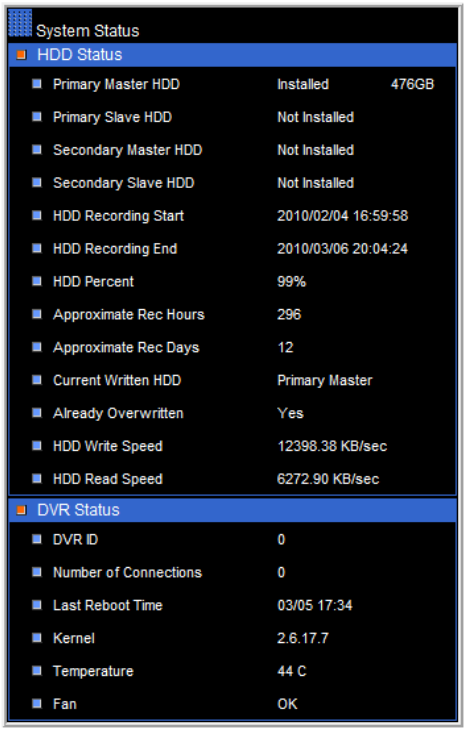
Chapter 8-3-7-2. User Setting

There are three levels (admin, operator and guest) of user authentication allowed in the DVR. To change password, please specify the old password, new password, and confirm password.



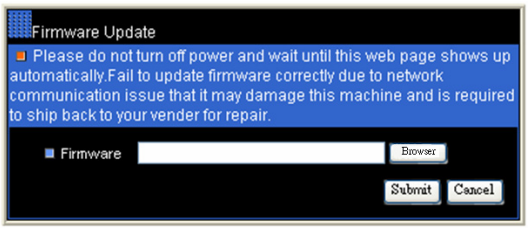
Chapter 8-3-7-3. System Status

Primary Master HDD—HDD detecting status of primary master IDE channel for the DVR
Primary Slave HDD—HDD detecting status of primary slave IDE channel for the DVR
Secondary Master HDD—HDD detecting status of secondary maser IDE channel for the DVR
Secondary Slave HDD—HDD detecting status of secondary slave IDE channel for the DVR
HDD Recording Start—Start recording time of the DVR
HDD Recording End-End recording time of the DVR
Approximate Rec Hours—Total recording hours available for the HDD(s)
Approximate Rec Days—Total recording days available for the HDD(s)
Current Written HDD—The HDD of the DVR in writing
Already Overwritten—The HDD(s) has been overwritten.
HDD Writing Speed—HDD writting speed detector
HDD Reading Speed—HDD reading speed detector
DVR ID—DVR ID/RS-485 ID
Number of Connections—Number of users accessing the DVR via network
Last Reboot Time—Last time for rebooting the DVR
Kernel—The OS version of the DVR
Temperature—DVR internal temperature indicator
Fan—Fan failure indicator



Chapter 8-3-7-4. Firmware update

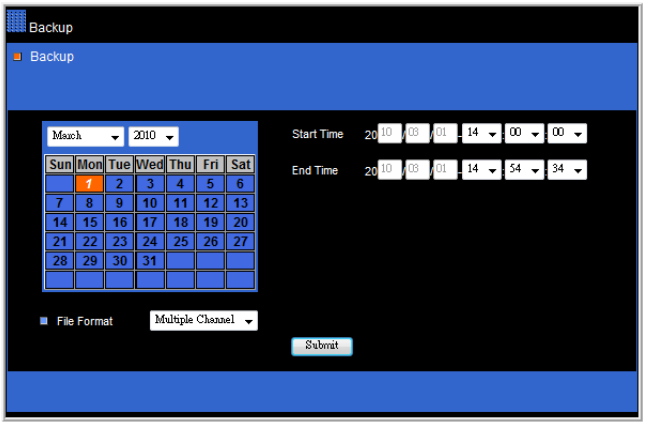
This DVR is allowed to perform firmware upgrade via network. After DVR receives the firmware, it starts to perform firmware upgrade automatically. After finishing the firmware update, HTML page gets reload. The user can then start to operator the DVR.


Firmware Update
Please do not turn off power and wait until this web page shows up automatically.Fail to update firmware correctly due to network communication issue that it may damage this machine and is required to ship back to your vender for repair.
Firmware
Browser
Submit
Cancel

To perform network firmware update, please click on Browse button and locate the firmware. For 4-channel, 8-channel, and 16-channel, the firmware file are flash304.bin, flash308.bin, and flash316.bin

Chapter 8-3-8. Backup

To perform remote video file backup, click Backup hyperlink. Please specify starting time and ending time. Click on Submit button to perform file backup task.

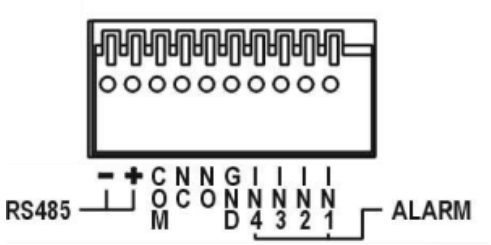


A backup progress bar shows up on the web page. After backup task ends, please click on the file hyperlink with LMP file extension. It can download the file from the DVR's internal HTTP server to your local PC.

To download the backup file(s) again, please click on "Backup File Download" hyperlink to download.

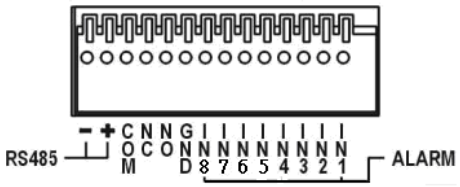
APPENDIX

Appendix A. 4-Ch DVR Alarm I/Os and RS485 for PTZ



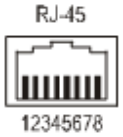
Pin 1	Alarm input 1
Pin 2	Alarm input 2
Pin 3	Alarm input 3
Pin 4	Alarm input 4
Pin 5	GND
Pin 6	ALARM NO (normal open)
Pin 7	ALARM NC (normal close)
Pin 8	COM
Pin 9	RS485+
Pin 10	RS485-

Appendix B. 8-Ch and 16-CH DVR Alarm I/Os and RS485 for PTZ



Pin 1	Alarm input 1
Pin 2	Alarm input 2
Pin 3	Alarm input 3
Pin 4	Alarm input 4
Pin 5	Alarm input 5
Pin 6	Alarm input 6
Pin 7	Alarm input 7
Pin 8	Alarm input 8
Pin 9	GND
Pin 10	ALARM NO (normal open)
Pin 11	ALARM NC (normal close)
Pin 12	COM
Pin 13	RS485+
Pin 14	RS485-

Appendix C. RS485 Input and Output Pin Assignment



Terminal	Name
1	--
2	--
3	--
4	--
5	RS-485 – Out Link Keyboard
6	RS-485 + Out Link Keyboard
7	GND
8	DC +12V input

Appendix D. Hard Disk Drive Support List

Model	HDD Size
WD5000AVDS	500GB
WD5000AVVS	500GB
WD10EVDS	1TB
WD3200AVVS	320GB
WD2500AVVS	250GB
WD20EVDS	2TB
ST3500418AS	500GB
WD10EURS-630AB1	1TB
WD10EURS-630AB1	1.5TB
WD20EURS-63S48Y0	2TB

Appendix E. Supported USB-DVD/RW and Disks

Manufacturer	Model
SONY	DRX-S30U-W
Lite-On	eSAU108
Lite-On	eTAU108
Lite-On	eHAU424-01

Brand	Specification	Capacity	Max Speed	Note
Melody	DVD-RW	4.7GB	4x	Rewritable
RiTEK	DVD-RW	4.7GB	8x	Rewritable
Sony	DVD+R	4.7GB	8x	Burn once
OEM disk	DVD-R	4.7GB	8x	Burn once

Appendix F. Supported USB Flash Disk

Transcend 8G, 16G

Kingston 4G, 8G, 16G

Sanddisk 8G, 16G

Appendix G. Hard Disk Recording Table

Approximate recording days and hours can also be found at Menu->System->HDD Info.

Table 1. 8-Ch

Recording Quality		Highest		High		Standard		Low	
HDD \ Picture size		5.8	KB/Pic	5.2	KB/Pic	4.0	KB/Pic	2.7	KB/Pic
500	GB	4	Days	5	Days	6	Days	9	Days
750	GB	6	Days	7	Days	9	Days	13	Days
1000	GB	9	Days	10	Days	13	Days	19	Days
2000	GB	18	Days	19	Days	25	Days	37	Days

Note: #1. Recording frame rate is 30 FPS * 8-Ch at CIF resolution.

#2. Above information may be inaccurate due to the installation environment.

#3. Recording Days calculate by a formula as following,

For example: 1TB HDD, Recording Quality Setting to = “Standard”

A day recording capacity of HDD =

4.0KB * 240 (Total FPS) *60 (Seconds) *60 (Minutes)* 24 (Hours) ÷ 1024 ÷ 1024 79GB

Approx. 1TB recording day(s) = 1000 GB ÷ 79GB 13 Days

#4. Total FPS at CIF resolution calculate by a formula as following,

Total FPS = Channel number * Frame rate per channel

For example: 30 FPS * 8-Ch at CIF resolution; Total FPS (240 Frame) = 8-Ch * 30 FPS

Table 2. 8-Ch

Recording Quality		Highest		High		Standard		Low	
HDD \ Picture size		19	KB/Pic	18	KB/Pic	12	KB/Pic	10	KB/Pic
500	GB	2	Days	2	Days	4	Days	5	Days
750	GB	4	Days	4	Days	6	Days	7	Days
1000	GB	6	Days	7	Days	8	Days	10	Days
2000	GB	10	Days	11	Days	16	Days	20	Days

Note: #1. Recording frame rate is 15 FPS * 8-Ch at D1 resolution.

#2. Above information may be inaccurate due to the installation environment.

#3. Recording Days calculate by a formula as following,

For example: 1TB HDD, Recording Quality Setting to = “Standard”

A day recording capacity of HDD =

12KB * 120 (Total FPS) *60 (Seconds) *60 (Minutes)* 24 (Hours) ÷ 1024 ÷ 1024 118GB

Approx. 1TB recording day(s) = 1000 GB ÷118GB 8 Days

#4. Total FPS at D1 resolution calculate by a formula as following,

Total FPS = Channel number * Frame rate per channel

For example: 15 FPS * 8-Ch at D1 resolution; Total FPS (120 Frame) = 8-Ch * 15 FPS

Table 3. 16-Ch

Recording Quality		Highest		High		Standard		Low	
HDD	Picture size	6.0	KB/Pic	5.2	KB/Pic	3.2	KB/Pic	2.7	KB/Pic
500	GB	2	Days	3	Days	4	Days	5	Days
750	GB	3	Days	4	Days	6	Days	7	Days
1000	GB	4	Days	5	Days	8	Days	9	Days
2000	GB	8	Days	10	Days	16	Days	18	Days

Note: #1. Recording frame rate is 30 FPS * 16-Ch at CIF resolution.

#2. Above information may be inaccurate due to the installation environment.

#3. Recording Days calculate by a formula as following,

For example: 1TB HDD, Recording Quality Setting to = “Standard”

A day recording capacity of HDD =

3.2KB * 480 (FPS) *60 (Seconds) *60 (Minutes)* 24 (Hours) ÷ 1024 ÷ 1024 129GB

Approx. 1TB recording day(s) = 1000 GB ÷ 129GB 8 Days

#4. Total FPS at CIF resolution calculate by a formula as following,

Total FPS = Channel number * Frame rate per channel

For example: 30 FPS * 16-Ch at CIF resolution; Total FPS (480 Frame) = 16-Ch * 30 FPS

Table 4. 16-Ch

Recording Quality		Highest		High		Standard		Low	
HDD	Picture size	19	KB/Pic	17	KB/Pic	13	KB/Pic	11	KB/Pic
500	GB	2	Days	3	Days	4	Days	5	Days
750	GB	4	Days	4	Days	6	Days	7	Days
1000	GB	5	Days	5	Days	8	Days	9	Days
2000	GB	10	Days	11	Days	16	Days	18	Days

Note: #1. Recording frame rate is 7.5 FPS * 16-Ch at D1 resolution.

#2. Above information may be inaccurate due to the installation environment.

#3. Recording Days calculate by a formula as following,

For example: 1TB HDD, Recording Quality Setting to = “Standard”

A day recording capacity of HDD =

13KB * 120 (Total FPS) *60 (Seconds) *60 (Minutes)* 24 (Hours) ÷ 1024 ÷ 1024 129GB

Approx. 1TB recording day(s) = 1000 GB ÷129GB 8 Days

#4. Total FPS at D1 resolution calculate by a formula as following,

Total FPS = Channel number * Frame rate per channel

For example: 7.5 FPS * 16-Ch at D1 resolution; Total FPS (120 Frame) = 16-Ch * 7.5FPS

	Specification		
Models	DVR304	DVR308	DVR316
Recording	SATA HDD: internal * 1	SATA HDD: internal * 2	
Recording mode	External alarm / motion detection / schedule / manual		
Video source	Analog * 4	Analog * 8	Analog * 16
Resolution	Full D1: 720 * 576 (PAL) 720*480 (NTSC) / CIF: 320 * 288 (PAL) 320 * 240 (NTSC)		
Recording NTSC	D1 120 / CIF 120 FPS	D1 120 / CIF 240 FPS	D1 120 / CIF 480 FPS
Recording PAL	D1 100 / CIF 100 FPS	D1 100 / CIF 200 FPS	D1 100 / CIF 400 FPS
Schedule	7 day * 24 hrs time table, recording mode configurable		
Backup	USB 2.0 flash disk / HTTP file download / Audio supported		
DVD/RW	External USB DVD/RW		
Playback	H.264 AVC video		
Speed	FR: 2x, 4x, 8x, 16x, 32x, 64x / FF:2x, 4x, 8x, 16x, 32x, 64x		
Compression	H.264 AVC and JPEG		
Video Input	Analog cameras		
Camera Name	12 characters		
Live video	PAL: 100 FPS/Sec NTSC: 120 FPS/Sec	PAL: 200 FPS/Sec NTSC: 240 FPS/Sec	PAL: 400 FPS/Sec NTSC: 480 FPS/Sec
Video Output	BNC * 1	BNC * 1 + Spot monitor	
VGA output	3D intellectual motion adoptive refinement with vivid image enhancement VGA engine up to 1920 * 1080i		
Backlight saving	LCD backlight saving mode		
Multiplexer	Sequence / digital zoom / freeze		
Digital zoom	ROI for 5X and 9X with PIP	No	
Split screen	4, PIP	4, 9	4, 9, 16
Spot monitor	No	Yes	Yes
Management			
Reports	Full alarm, configuration, and operation reports exporting over HTTP or USB		
Authentication	User authentication with feature configurable		
Recording day	Dynamic recording day calculation		
Alarm/event	DI * 4 and DO * 2 (NO/NC)	DI * 8 and DO* 2 (NO/NC)	
Motion	Motion grid 30*24 each channel, 8 sensitivities		
Event	External alarm, video loss, stop recording, power recovering, motion detection, schedule, logon, HDD format		
Email	Alarm notification with JPEG attachments		
Accessories	Remote controller addressable up to 255 DVRs		
P/T/Z protocol	LILIN MLP2 and Pelco RS-485		
Keyboards	None	PIH-931D keyboard	
IR receiver	None	Extra IR extension connector, up to 200 m	
Mouse	USB / PS-2, drag-n-drop, right-mouse-click, mouse wheel.		
Audio	G.711 audio, 0.7Vp-p, 16KHz		
Audio In/out	RCA 1 in, 1 output	RCA 4 in , 1 output	
Remote control	Yes		
Network	Direct Internet browser access / multiple users access		
Protocols	ARP / TCP/IP / UDP / HTTP / SMTP / FTP / DDNS / PPPoE / DynDNS / NTP		
Web	Live / event log & time search playback / AVI / snapshot		
DVR status	HTML DVR status		
IPScan	IPScan supported, easy-to-setup for IP address		
Software			
BackupManager	Multiple DVRs FTP file download and multi-channel playback		
Mobile phone	iPhone, and Android mobile phone supported		
Others			
WDT	Hardware watchdog timer		
DST	Daylight saving time		
Multilanguage	English, Chinese, Spanish, Danish, Swiss, Norwegian, Arabic, Japanese, Germany, French, Polish, Portuguese, Simplified Chinese, Vietnam, Italian		
CPU/OS	32-bit RISC Processor, ARM926 SoC 336 MHz, Linux 2.6 kernel		
Power	DC 12V, 4.2A, 48W	DC 12V, 5.0A, 60W	
Working Env.	Temp: 0℃ ~ +50℃ / Humidity: 0%~80%		
Dimension	290 mm * 52mm * 260mm	360mm * 60mm * 308mm	
Weight	1.5 Kg	3.0 Kg	

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